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Dynamical amplifier of global warming

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The poleward heat transport by the atmosphere and oceans reduces the equator-to-pole temperature contrast, creating a locally non-radiative equilibrium time mean state. A direct response to an increase in the atmospheric emissivity associated with anthropogenic greenhouse gases is an increase in the atmosphere equator-to-pole temperature contrasts that acts to strengthen the atmospheric poleward heat transport. As a result, part of the extra amount of energy intercepted by the low-latitude atmosphere due to an increase in its opacity is transported to high latitudes. This implies a "greenhouse-plus" ("greenhouse-minus") feedback to the high (low) latitude surface temperatures that amplifies (reduces) the initial surface warmings in high (low) latitudes. The Stefan-Boltzmann feedback suppresses the negative dynamical feedback relatively to the positive, amplifying the global mean surface temperature warming. For an anthropogenic radiative forcing of $4 gm^{ty}$, the dynamical amplifier alone can give rise to a difference of 0.3 K between high- and low-latitude surface warmings and 0.1 K between land and oceans, and an additional warming of 0.07 K in the global mean surface temperature in winter.